

CHAPTER 15 – SCHEDULING

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Introduction

Scheduling is a critical element for both FDOT and consultant personnel in the successful execution and delivery of their respective projects. Within FDOT, scheduling serves two fundamental purposes. First, schedules are used by FDOT for purposes of tracking the overall delivery of projects and reporting that progress back to District and Central Office senior management. The second purpose of schedules is to serve as a tool for use by project and task managers to effectively manage and execute projects on a day to day basis.

The majority of FDOT projects are accomplished by consultants with the remaining projects done with in-house staff. Schedules developed by FDOT can be quite different than schedules developed by consultants. FDOT schedules include many activities that are required for internal administrative purposes (such as contracting, funding, and internal approvals) that are not relevant to the consultant's execution of a project. On the other hand, a consultant's schedule will typically include many more activities detailing the delivery of the project. FDOT in-house design project schedules should include the same level of project activities as a consultant's schedule.

The purpose of this chapter is to provide background in the preparation and effective use of scheduling as a tool for project management, recognizing that practices related to scheduling vary by district. Many districts have detailed scheduling guidelines that the Project Manager should refer to before developing a schedule. This chapter focuses on the basics of the Critical Path Method (CPM) of scheduling while addressing the benefits of a schedule, how to build and use a schedule, some techniques for managing the schedule, some examples of effective reports, and finally, how to identify and correct common schedule problems. Scheduling is a necessary skill for project management. At the end of this chapter is a list of useful references for more detailed information on scheduling techniques. Although much scheduling literature is related to construction scheduling, the same techniques apply to any project phase (i.e. planning, Project Development and Environmental (PD&E), design or maintenance).

Why Do We Need Schedules?

The benefits of project schedules quite simply are its use as a management and communications tool that can be used to anticipate and prevent problems from occurring.

Here are some advantages a carefully prepared and regularly updated schedule can provide for the project team members.

- The schedule preparation process can help the team think through the project from beginning to end. Sometimes this planning step is overlooked or shortened in the interest of getting a schedule in place

quickly. Documenting the rationale for the schedule helps everyone stay focused on the logical sequence of activities.

- It is a management tool for the FDOT Project Manager, other district staff and the consultant Project Manager. If all team members have input and are regularly involved in the updating process, then the schedule can provide a road map to successful project completion.
- It helps to manage the dollar commitment for each stage of the project. Because the schedule can be “loaded” with the resources required for each activity in terms of staff and dollars, it allows the projection of expenditures of project funds.
- It increases efficiency. Team members can focus on the critical data activities.
- It can provide a performance measure as well as a historical record that can be used to develop or refine templates to make scheduling of future projects more accurate.
- It can help ensure a quality product by incorporating time for quality check activities into the schedule at appropriate points.
- It allows the project to be delivered on schedule.

How Do We Use Schedules?

The schedule can be used in ways other than supplying historical information and determining if a project is ahead or behind schedule. Some other uses are:

- It can be a valuable tool for the allocation of additional funds. Many districts maintain a framework of all projects in the district interfaced with individual project schedules. This overview allows easy evaluation of where to place additional funds in the overall work program.
- Similarly, this structure facilitates the reallocation of funding within a given time frame.
- The schedule can facilitate evaluation of resources to aid in focusing them to handle critical needs in response to a potential or actual delay.
- It can be used in a mentoring program with training for new PMs to familiarize them with District processes.
- The schedule provides a look beyond what has happened to what might happen, thus allowing the PM to proactively anticipate, mitigate and eliminate potential problems.

Responsibilities for Scheduling

Many individuals are involved in the preparation, updating, and maintenance of schedules throughout the life of a project. It is important to understand the responsibilities of the key players:

District Schedulers develop, update and maintain schedules for all projects. District schedulers are typically the only individuals with access to the scheduling software. District schedulers prepare initial schedules based on the project scope of work and input from consultants and PMs.

- District Project Managers review and modify the initial project schedule, monitor schedules on an ongoing basis, provide schedule updates to District Schedules at least monthly, and assess consultant progress.
- Consultant Project Managers develop schedules necessary for them to manage their work. The milestone dates included in the consultant schedules must be coordinated with the Department's schedule through the FDOT Project Manager and District Schedulers. Consultant Project Managers should prepare monthly schedule updates and progress reports.
- Functional units review their respective components of a schedule for agreement with the scope of work and assure that the appropriate activities and time durations are included.

The Basics of Scheduling

Project schedules can range from simple bar charts with few activities to complicated CPM schedules with thousands of activities. A simple bar chart showing the start and finish dates of project activities, is known as a Gantt chart. The basic difference between a Gantt chart and a CPM schedule is that the CPM contains relationships between activities and allows date constraints to be placed on individual activities. Thus, for small or simple projects where activities are consecutive or connected end-to-end a Gantt chart may be adequate. However, as projects become more complicated, activities will occur concurrently and complex relationships will develop. In these cases, a CPM schedule may prove to be more effective and provide more benefits.

A Gantt chart is illustrated in Figure 1, and a CPM Chart in Figure 2.

Figure 1
Sample Gantt Chart

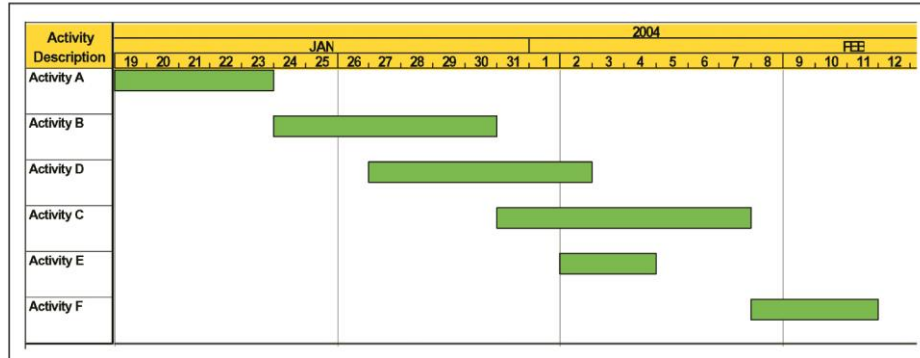


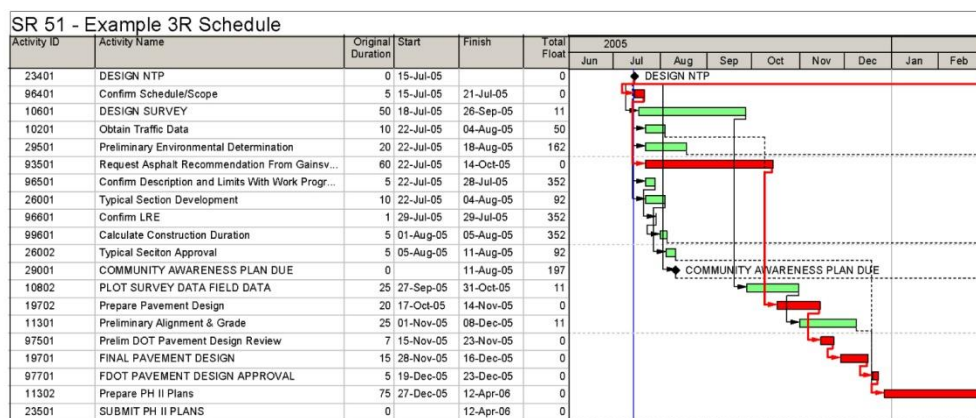
Figure 2
Sample CPM Chart



- Before explaining the nuts and bolts of the CPM, it is important to point out that:
- The schedule is a **tool** for project management.
- The schedule is a “*living*” document. It needs to contain current information and conditions that provides an up-to-date picture of the project. One common complaint about schedules is that, once they are prepared, they are hung on the wall to turn yellow and never be used again. The “living” nature of the CPM is one of its big advantages as the impact of an update or a potential change is readily apparent.
- The schedule must reflect *reality* so that any potential slippage in the schedule can be identified early and the situation corrected before it becomes a serious issue. One common pitfall is to make the schedule fit target or project milestone dates by assigning unrealistic durations to individual activities. Some of the current CPM software allows automatic updating of activities. While using this automated feature is easier than verifying the status of each activity separately, this practice may show the project as continuing on schedule from month to month when it really is starting to fall behind.
- The critical path can *change*. Since the schedule is a living document the critical path can and often does change to reflect the dynamic nature of FDOT projects.

Examples provided in this chapter are based on a hypothetical example project on SR 51 located in Central Florida. The project involves designing RRR improvements to a 2 mile segment of the highway through a rural community. Specific work includes ADA improvements and signal upgrades. A portion of the project schedule is shown in Figure 3. The full schedule is provided at the end of the chapter.

Figure 3
Sample 3R Project Schedule



Elements of a Schedule: Schedules consist of 7 basic elements: activities, dependencies between activities, relationships, durations, milestones, constraints and the critical path. Each of these elements must be carefully considered when preparing a schedule as an error in any one element can have significant impacts on the overall schedule.

- **Activities:** Activities are a component of work performed during the course of a project. The number of activities or tasks, in both the FDOT and consultant/contractor' schedule will vary depending on the phase, type and complexity of the project.
- **Dependencies:** There are three kinds of dependencies between activities:

Logical: It is impossible or illogical to begin one activity until another is completed. For example, Phase I plans cannot be completed before the topographic survey is obtained

Resource constraints: The availability of resources dictates how long it will take to complete an activity. For example, it is possible to complete the field survey on SR 51 in 10 days but not if there is only one field survey crew available.

Discretionary (preferential): The order the activities are completed is based on the preference of the project manager. For example, the project manager would like to complete the field survey before the typical section package is submitted for review, although it could be submitted while the field survey is underway.

Relationships: Relationships are the link between related activities within a schedule. Figure 4, **Definition of Schedule**

Relationships, shows the four kinds of relationships with respect to the *sequencing* of activities (in order of decreasing frequency of use).

Figure 5, **Typical Schedule Relationships** illustrates the three most common relationships and how they would be used in a schedule.

- **Durations:** The anticipated time required to complete a schedule activity.
- **Milestone:** A significant point or event in a project. A milestone has a duration of zero. Figure 5, **Typical Schedule Relationships**, highlights one milestone event.
- **Constraints:** Activities are constrained when they are limited to certain dates, rather than flowing with the natural logic of a network. We use constraints to maintain compliance with the Work Program.

Figure 4
Definition of Schedule Relationships

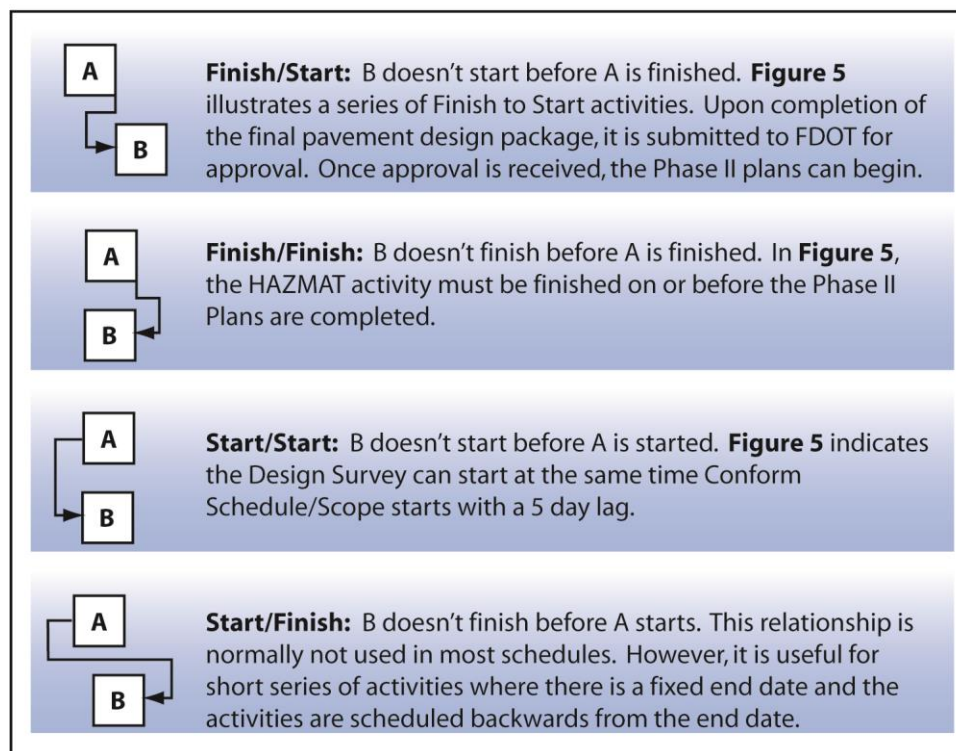
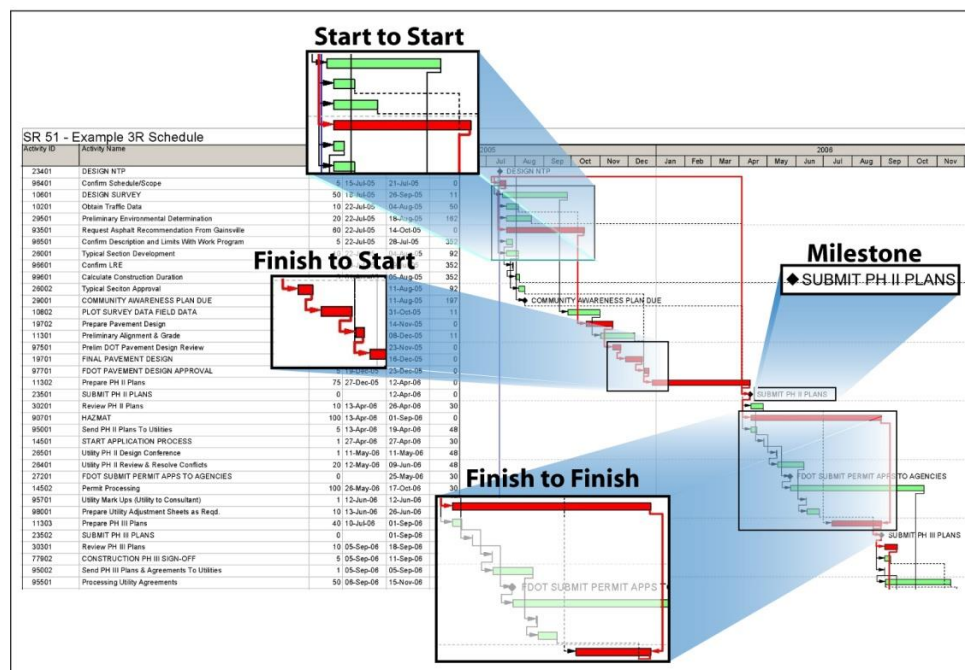
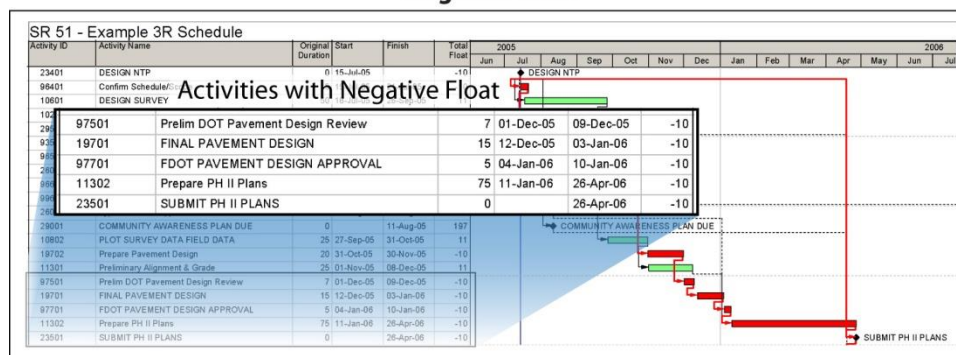


Figure 5
Typical Schedule Relationships



- **Constraint Dates** are manually applied to the start or finish of an activity rather than having the date calculated solely on the logic of the network. For example, to keep activities within a funding year, Start No Earlier than (SNE) or Finish No Later than (FNL) dates can be used to help the PM keep specific activities in line with it's phase in the work program. The beginning and end of programmed phases are committed dates and are therefore, commonly constrained. Similarly, mandatory start or mandatory finish dates can be used to lock in a particular start or finish date. Mandatory dates are often used with contract milestones, specific agency approval dates and public hearings. It is important to use constraint dates accurately to ensure that schedules do not mis-lead anyone. Constraints that result from mandatory dates often disregard schedule logic, and thus the schedule is misleading.
- **Critical Path:** The longest path through a project network. Any delay on this path will result in a corresponding delay of the end date of the project.
- **Early Start:** The earliest date an activity can start according to the network logic and/or constraints.
- **Early Finish:** This is the Early Start date plus the duration of the activity.
- **Late Finish:** The latest date an activity can finish without delaying the completion of the project.
- **Late Start:** The Late Finish minus the duration of the activity.
- **Float:** Although there are several different types of float, total float is most commonly used. Total float is the difference between the early finish date and late finish date of an activity (early and late start dates could also be used). Positive float indicates how many days an activity can slip before the activity will cause a slip in the end date of the project. Similarly, negative float indicates how late the end date will be delayed if an activity continues to have the same negative float and no change is made to subsequent activities. Figure 6, **Float and Constraints**, illustrates negative float in a CPM schedule.

Figure 6
Negative Float



- **Software.** FDOT adopted Primavera P3 as the official scheduling software in 1993. The current version being used is P3e/c. Primavera is a data based enterprise program that allows scheduling information for all FDOT projects to be combined and reports written that summarize project production statewide. Consultants typically use Primavera P3 or P3e/c, Suretrak (which is a pc based program that is compatible with Primavera), or Microsoft Project.
- Project Schedule and Management (PSM) is the current statewide scheduling system, maintained by Production Management. Districts use P3/P3e/c to prepare schedule data for import into the PSM system.

Level of Detail in Schedules: As noted above, the level of detail required in a schedule depends on the complexity of the project. The level of detail also depends on who is using the schedule. The schedule used by an FDOT project manager overseeing a consultant project is typically quite different than one used by the consultant to manage the execution of the project. Schedules used by FDOT project managers overseeing consultant projects will typically include many internal Department activities as well as the key milestone deliverables to be received from the consultant (for example phase submittals, typical section package, and reports). The consultant project manager may typically use a schedule that excludes all the Department activities but will provide the detailed sub activities that are required to complete and submit the deliverables to the Department. When reviewing a consultant's schedule, the FDOT project manager should check the following items:

- Delivery dates for submittals to the Department or agencies (submittal of permit applications) are on or before the dates shown in the Departments schedule
- Key milestones are met, such as the 268 (Documents to ROW) date and Production date.
- The logic between activities is appropriate
- Activity durations seem reasonable

Schedule Initiation

Schedules are created for each project when it is added to the Work Program. Typically, the District Scheduler will select a schedule template based on the type of project and will modify the template to match the initial scope of work. Standard activity durations contained within a template can be used to determine the overall project duration. The FDOT project manager should review the schedule prepared by the District Scheduler prior to entering into the Work Program. As projects progress, assigned project managers should review and

update schedules during the gaming cycle. The following generally describe how different types of projects enter the work program:

Planning Projects: Planning projects are generally included in the work program as District-wide allocations and therefore project specific schedules are not developed. When a specific planning study is identified in the work program, a project schedule should be developed and reviewed by the Planning Project Manager. Under District-wide allocations, the District allocates a certain portion of funds to planning level task assignments. Once a task assignment has been made to a consultant, the consultant should prepare a schedule for review by the FDOT project manager and their scheduler.

PD&E and Capacity Projects: With the exception of FIHS projects, PD&E Studies and capacity projects in Design, Right of Way or Construction are generally those that have been assigned a priority by a local agency or Metropolitan Planning Organization (MPO). The District evaluates the local requests and adds projects into the work program in coordination with the local agency. PD&E projects are generally added to years 3-5 of the new 5-year work program, but depending upon factors including funding and other considerations, they could be added in the 1st or 2nd years of the program, or even in the current fiscal year with the approval of a work program amendment. Later phases of capacity projects (Design, Right of Way, Construction) are entered into the work program at the discretion of the District. In some instances, Districts use a general time-frame between production phases, (i.e. 2 years for PD&E, 2 years for Design, and 2 years for Right of Way) in programming later phases of the work program. In other instances, later phases are not entered until an earlier phase has progressed to a more developed stage. As noted above, the FDOT project manager should review the schedule prepared by the District Scheduler for scope conformance and appropriateness of durations when a project phase enters the work program.

Resurfacing Projects. Each year the Department's District Materials Offices provide their District with pavement condition results on all State facilities. From this list, facilities are identified for a need of future resurfacing. Each District employs its own practices for evaluating the pavement conditions and prioritizing future resurfacing improvements. In general, Districts enter construction for new resurfacing projects in the 3rd or 4th year of the new work program during gaming. Design phase funds (and Right of Way phase as necessary) are added in advance of construction. Generally, Design is entered in the new work program's 1st year.

Safety Projects: Improving safety on existing facilities is extremely important to the Department. Each District utilizes District-wide funds for studying opportunities to make safety improvements on facilities. These projects are developed from local requests (each District works with local Community Traffic Safety Teams), maintenance requests, or other means. Similar to Resurfacing Projects, Safety Projects enter the work program at the discretion of the District.

Generally, construction is funded in years 2-4 of the new work program, and design is funded in the current or 1st year. Many of the Districts maintain a District-wide design contract to handle design of Safety Projects to expedite their completion. In some cases, in-house design forces are assigned Safety Projects to further expedite their delivery.

Bridge Repair Projects: Bridge Repair projects are derived from allocations made at the CO level based on inspections of existing structures. The design for Bridge Repair projects is generally handled out of maintenance groups in the Districts, or under the direction of the District Structures office. Projects for routine work are handled with District-wide Structures Design contracts on an annual basis or in-house design staff. Construction is normally funded in the current or next fiscal year.

Right of Way Projects: Other than advanced Right of Way activities, the Right of Way Acquisition phase for capacity and other projects is generally connected to Design and/or PD&E activities. How a Right of Way Acquisition phase enters the work program and the duration allocated for the phase varies significantly by District. Some Districts will routinely enter the Right of Way Acquisition phase into the work program 2 years after the Design phase enters the work program. Other Districts will hold entering the Right of Way phase until it is clear when the Design phase is nearing completion.

Building a Schedule

Templates: Primavera schedule templates have been developed independently by each District. The number of templates developed, the level of detail of the templates, and the use of the templates varies significantly by District. Templates have been developed for Professional Services Units (PSU) contracting activities, as well as PD&E and various design projects. The FDOT project manager should review each template after it has been chosen for a project by the District Scheduler for scope conformance and appropriate activity durations.

Schedule Development: The easiest and most efficient way to build a schedule is to work from an existing schedule to help identify the required sequences and time durations for the new project. A second way to build a schedule is to utilize templates developed by the District. One caveat when using a template is to be sure to think through each step in the template carefully to ensure it applies to the current project. Individual projects may have unique conditions that will vary from the typical project reflected by a template. It is easy to pick up the template, quickly run through it and hand it off to a scheduler. The end result of such a lack of scrutiny may be overlooking some critical areas.

There are several necessary tasks that are not always included in a project task list. These include all the steps necessary for adequate quality control, FDOT reviews, graphics production, printing and assembly, meetings and other important project-management functions. These tasks are equally as important

to project success as the project-specific production tasks, and they must be accounted for in the schedule.

When developing a schedule, it is important to understand the use of constraining dates. When a CPM schedule is used, the activities are linked together, durations are assigned, and resources and responsible team members may be identified. But there should be another step in the process—outside constraints must also be considered before the schedule is complete. In the Basics of Scheduling section at the beginning of this chapter several types of date constraints are described. There are many issues related to constraints such as the need to:

- Identify FDOT constraints that should be incorporated into the schedule, including both funding and legal requirements (such as the time required to give a property owner prior to negotiations).
- Identify those who can supply other critical dates—district right of way manager and technical support services staff (geotechnical, surveying and mapping, and others).
- Recognize any external commitments that have been made that may be beyond the control of the Project Manager.
- Recognize other external factors that may impact the schedule. For example, local events such as school openings or closings, community celebrations and city or county board meetings, volunteer advisory committees or necessary coordination with non-FDOT projects as well as coordination with other FDOT projects and Value Engineering needs.
- Balance the letting plan so an unmanageable number of projects are not clustered in the same quarter but are distributed throughout the year.
- Coordinate with the schedule of the consultant PM. Although schedules prepared and used by consultants may have different purposes than that of the FDOT, certain activities must be coordinated with FDOT.

Managing the Schedule

Managing the schedule is a significant part of the Project Manager's role. Effective schedule management means responding to the changing needs and requirements of the project as well as to outside influences. It means making adjustments to advance, slip or compress the schedule.

Validate the Initial Project Schedule: Once a project has moved into the current adopted work program the assigned FDOT project manager should carefully review the project schedule to make sure it is reflective of the project

scope, unnecessary activities have been removed, all constraints have been incorporated, and activity durations are appropriate. As the project scope is refined through the consultant selection and negotiation process, the FDOT project manager should continue to refine the project schedule. Upon completion of negotiations, the FDOT and consultant project managers should update and coordinate the Department's and consultant's schedules and provide this information to the District Scheduler.

Monitoring Schedules: When monitoring a project schedule, project managers should:

- Focus on the critical path activities when monitoring a schedule. Delays in activities on the critical path will impact the completion date of the project unless corrective action is taken. While non-critical activities need to be completed in a timely manner, they will not affect the completion of the project until they cannot be finished by the Late Finish date.
- Understand the constraints used in preparing the schedule. Are activities connected because logic dictates the order in which they occur? Do manpower or other resources dictate how the activities are to be connected? For example, if you only have one survey crew, they cannot be on two jobs at the same time.
- Some key indicators to be aware of that may have a major impact on the schedule are shown in Figure 7, **Project Schedule Speed Bumps**.

Figure 7
Project Schedule Speed Bumps



Design Concept Acceptance - Good schedules are an essential tool for anticipating and coordinating upcoming work. Project managers can use the schedule to look ahead 30 or 60 days to alert the various offices, units, disciplines, and subconsultants that activities will be starting that impact them, or that deliverables will be coming in that require their attention. Project managers can use the schedules to make sure adequate resources are available to accomplish the upcoming work. Key indicators that warn a project manager that the schedule may be in trouble include:

- Negative float or a reduction in positive float from month to month.
- Non-critical activities are consistently late. This may be indicative of future problems completing critical activities.
- There are too few activities to adequately manage the project, or a major activity has a very long duration. For example, there are dozens of sub activities that comprise preparation of a 30% plan set for a 3R project. If a schedule wraps all those activities into one line item there is no way to accurately assess the progress of the project until it is too late to make schedule adjustments. The FDOT project manager should request a more detailed schedule that will enable adequate monitoring of individual activities.
- The project team assigns too few resources to accomplish the project as scheduled. The FDOT project manager should discuss concerns with the consultant project manager.
- A critical path that does not make sense or does not meet the contractual milestones.
- Activities that have too much float.
- Inaccurate or unnecessary constraints.
- Continuously late updates or updates with inaccurate actual start and/or actual or expected completion dates.
- All activities are exactly on schedule with no change in float from month to month. While this hopefully indicates great scheduling ability with an exceptional project team that completes every activity exactly on schedule, it could also indicate that the schedule was updated automatically with little thought or was being updated to mask an ongoing problem.

Schedule Updating: The importance of accurate, timely updates cannot be overemphasized. The frequency of updating depends on many factors including size and complexity of the project. Even when the standard may be to use monthly updates, there may be phases or portions of the project when weekly updates will be appropriate. These updates may be manual rather than a complete computer update. Accurate updating is very important when the

schedule is a source of information for consultant or contractor payment. All parties should be promptly notified when the schedule changes so they may adjust other affected schedules.

The monthly update process is well defined in each District. The FDOT project manager should contact the District Scheduler to determine the specific procedures used within the District. The FDOT project manager should establish a procedure for the consultant to provide monthly progress reports, and if necessary an updated schedule, prior to submitting the monthly update to the District Schedulers.

In addition to monthly updates, it may be necessary for a project manager to conduct additional updates. These updates should be done as soon as a major milestone is achieved, such as a phase submittal or receiving a permit, or when something happens that may impact the project schedule or the work of other units or team members.

Should there be a major schedule problem, such as surveying being completed late, or a 3R project now needs a ROW phase, the project manager should immediately review and update the schedule as necessary. The project manager should coordinate with all appropriate team members to determine the impact of a schedule change on their respective activities prior to updating the schedule. The project manager should evaluate action items that could correct the schedule problem with team members. Actions a project manager could take to correct or recover from a schedule problem include:

- Verify that the update is accurate. Are all remaining durations correct?
- Review activity durations and shorten them if possible and realistic.
- Add more resources to the team to accelerate the schedule.
- Eliminate unnecessary activities. Are there activities that came from a template or previous project that are not applicable on this phase of this project?
- Change logic. The tendency is to link all activities from the end of the preceding activity to the start of the next (finish to start). Activities can overlap or be connected by lag activities, thus some activities may be able to start during a previous activity rather than at its completion.
- If all else fails, adjust commitment dates or create a new schedule. But before making changes, get formal approval. Be aware that funding year changes may need to be approved by a higher authority.

It is best to identify activities that bear the greatest risk of being delayed, such as permitting, right of way acquisition and delivery time of special materials. When the schedule is first developed, plan options for recovery if these activities are delayed. Then there will not be an “oops” because the problem was anticipated and an alternative solution implemented.

Major Schedule Changes: Once it is determined the scheduled completion date must be delayed there are specific steps the FDOT project manager must take that have been established by each District. The FDOT project manager is responsible for following the schedule change procedure and getting the necessary approvals prior to making the change. Once a change is approved, the FDOT project manager must work with District Schedulers, representatives from units impacted by the schedule change as well as the consultant project manager. All impacted units, consultant project manager, and senior District staff must agree on the proposed changes prior to finalizing the revised schedule.

Lessons Learned: Project managers should evaluate their project at completion to identify areas where improvements can be made with respect to the project schedule. The project manager should discuss the project execution with all team members to identify root causes to problems and identify potential corrections. The FDOT project manager should meet with District Schedulers to update schedule templates as needed.

Schedule Reporting

The schedule can be presented in three basic formats. The logic diagram shows all the activities and the interconnections or constraints between each activity. A time-scaled diagram presents the logic on a time line, which makes it easy to see what date activities are planned to occur. The bar chart shows the activities on a calendar grid, but without the constraints. These formats are illustrated in Figures 8-10.

A variety of tabular reports can also be produced. The advantage of these reports is that they allow the user to focus on specific areas of interest or concern without having to digest the full schedule report. Reports can be sorted by area, department or responsible party. They can also be limited to activities that will occur in a specific period of time, such as a specific fiscal year or the next 30 days. A report of critical or near-critical activities can help focus the team on potential areas of concern. Samples are provided in Figures 11-14.

Each District has different “standard” reports that are prepared for project managers and senior district staff and managers. FDOT project managers should coordinate with the District Schedulers to tailor reports that provide information he/she specifically would like to see to assist in managing their projects. These reports should include the CPM diagram so that schedule impacts can be assessed.

Figure 8
Logic Diagram

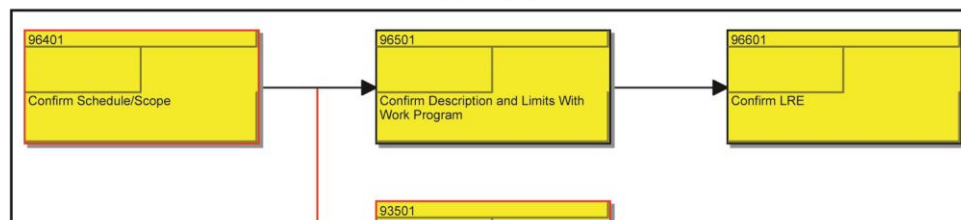


Figure 9
Time-Scaled Diagram

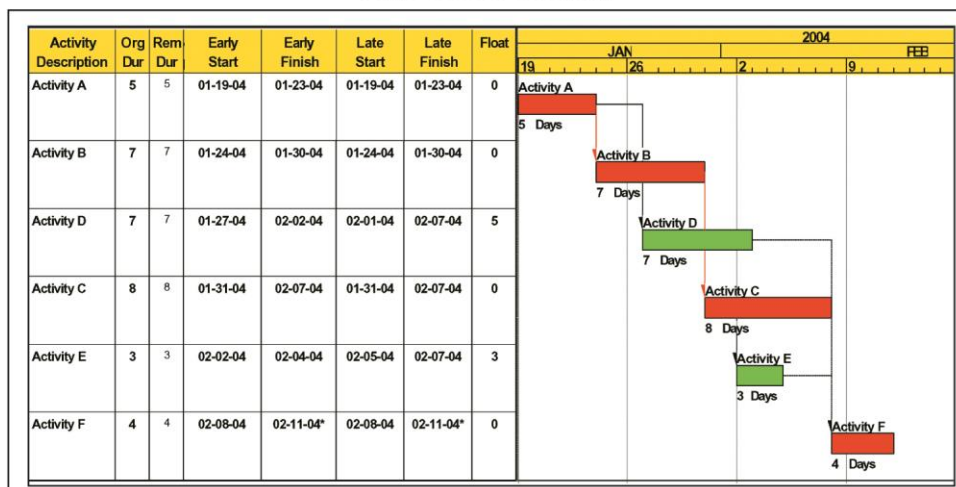


Figure 10
Sample Bar Chart

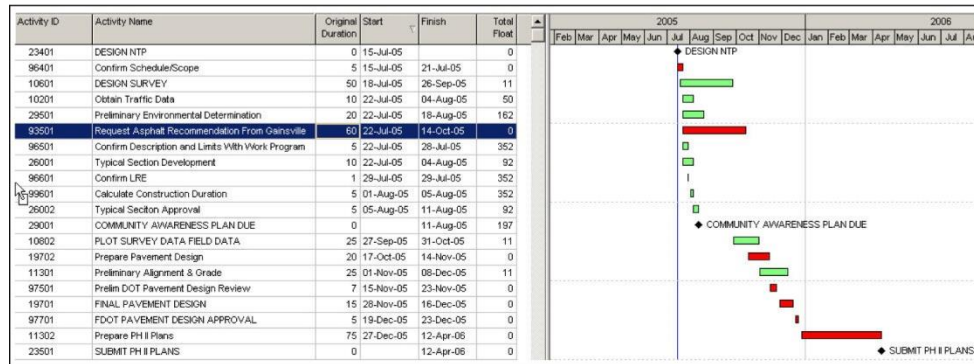


Figure 11
Responsibility Sort

Activity ID	Activity Description	% Compl	Original Duration	Remaining Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Budgeted Cost
Richard Stevens - Site Project Manager										
P1G100	MOBILIZATION	100	4	0	04-23-99A	04-27-99A	04-23-99A	04-27-99A		100.00
Alice White - Purchasing										
P1NP200C	PROCUREMENT OF SIGN STRUCTURES	100	10	0	05-02-99A	06-03-99A	05-02-99A	06-03-99A		20,000.00
Pete Reynolds - Electrical Crew Foreman										
P2N2125B	INSTALL TEMP. ELECTRICS	0	15	15	04-06-00	04-26-00	05-30-00	06-19-00	38	8,884.80
P2N2130	INSTALL ELECTRIC CONDUITS &	0	19	19	04-27-00	05-23-00	06-20-00	07-17-00	38	42,243.08
P2N2140	INSTALL POWER & LIGHTING	0	15	15	05-24-00	06-13-00	07-18-00	08-07-00	38	16,954.80

Figure 12
Look Ahead Report

Activity ID	Activity Description	% Compl	Original Duration	Remaining Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Budgeted Cost
P1N2100	PLACE CONST. BARRIER	0	14	14	01-06-00	01-25-00	01-06-00	01-25-00	0	17,799.84
P1N2190	INSTALL SIGN SUPPORT STRUCTURE	0	8	8	01-06-00	01-17-00	10-13-00	10-24-00	200	6,895.36
P1N2195	ERECT SIGNS	0	3	3	01-18-00	01-20-00	10-25-00	10-27-00	200	5,371.56
P1N2115A	GRUB & STRIP TOPSOIL	0	8	8	01-26-00	02-04-00	01-26-00	02-04-00	0	12,533.12
P1N2105B	INSTALL EROSION CONTROL DEVICES	0	15	15	02-07-00	02-25-00	02-07-00	02-25-00	0	3,760.32
P1N2200	INSTALL TEMP. SHEETING	0	12	12	02-28-00	03-14-00	02-28-00	03-14-00	0	9,347.04
P1N2210	EXCAVATE RETAINING WALL	0	12	12	03-15-00	03-30-00	03-15-00	03-30-00	0	7,542.24
P1N2220	CONSTRUCT FOOTING	0	27	27	03-31-00	05-08-00	03-31-00	05-08-00	0	110,196.72
P2N2115B	REMOVE GUIDE RAIL	0	4	4	03-31-00	04-05-00	05-24-00	05-29-00	38	3,115.68
P2N2125A	EXCAVATE FOR ELECTRICAL	0	10	10	04-06-00	04-19-00	06-06-00	06-19-00	43	6,141.20

Figure 13
Critical Activities Report

Activity ID	Activity Description	% Compl	Original Duration	Remaining Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Budgeted Cost
P1N2100	PLACE CONST. BARRIER	0	14	14	01-06-00	01-25-00	01-06-00	01-25-00	0	17,799.84
P1N2115A	GRUB & STRIP TOPSOIL	0	8	8	01-26-00	02-04-00	01-26-00	02-04-00	0	12,533.12
P1N2105B	INSTALL EROSION CONTROL DEVICES	0	15	15	02-07-00	02-25-00	02-07-00	02-25-00	0	3,760.32
P1N2200	INSTALL TEMP. SHEETING	0	12	12	02-28-00	03-14-00	02-28-00	03-14-00	0	9,347.04
P1N2210	EXCAVATE RETAINING WALL	0	12	12	03-15-00	03-30-00	03-15-00	03-30-00	0	7,542.24
P1N2220	CONSTRUCT FOOTING	0	27	27	03-31-00	05-08-00	03-31-00	05-08-00	0	110,196.72

Figure 14
Location Sort

Lane	Activity ID	Resp	Rem Dur	%	Early Start	Early Finish	Total Float	Resource
Station 050 + 00								
General Construction								
Walk/Road/Parking Appurtenances								
N05	P1N2190	GG	8	0	01/06/00	01/17/00	200	LABOR-G, DRIVER, FOREMAN,
N05	P1N2195	GG	3	0	01/18/00	01/20/00	200	CRANE, FOREMAN, OPERATOR,
Northbound Outer Lane								
Grading								
SO3	P2N3120	GG	7	0	04/27/00	05/05/00	124	FOREMAN, DOZER, OPERATOR
Electrical Utilities								
SO4	P2N2130	PR	19	0	04/27/00	05/23/00	38	ELEC, FOREMAN, LABOR-S,
SO4	P2N2140	PR	15	0	05/24/00	06/13/00	38	ELEC, LABOR-S, FOREMAN,
Station 075 + 00								
Southbound Outer Lane								
Barriers & Enclosures								
N07	P1N2100	GG	14	0	01/06/00	01/25/00	0	LABOR-G, CRANE, OPERATOR,
Northbound Outer Lane								
Removals								
SO4	P2N2115B	GG	4	0	03/31/00	04/05/00	38	FOREMAN, LABOR-H, LOADER,
SO3	P2N3110	GG	9	0	04/14/00	04/26/00	124	FOREMAN, LABOR-G, LOADER,
Excavation & Backfill								
SO4	P2N2125A	GG	10	0	04/06/00	04/19/00	43	FOREMAN, LABOR-G, LOADER,
Asphaltic Concrete Pavement								
SO4	P2N2150	JAM	14	0	06/14/00	07/03/00	38	FOREMAN, ROLLER2, OPERATOR,

Figure 15
SR-51 Example 3R Schedule

